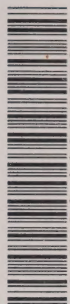


CAI
T 46

nal publications

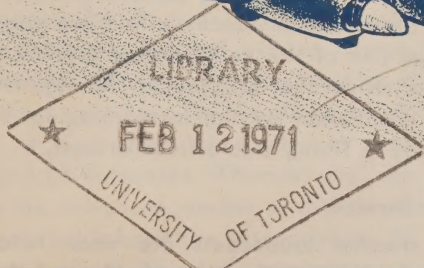
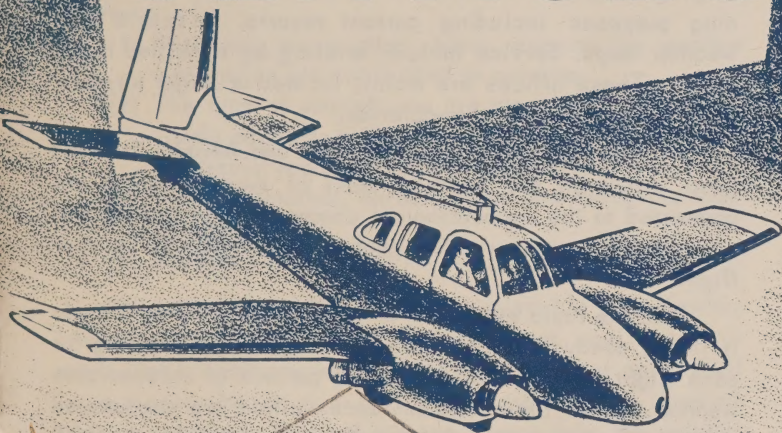
Government
Publications

2 001



3 1761 11635853 2

AVIATION WEATHER SERVICES



METEOROLOGICAL BRANCH
DEPARTMENT OF TRANSPORT - CANADA

To the Pilot

CAIT 46
- 7001

This booklet is your guide to Canadian Weather Services, a portable set of answers to the basic questions:

Where can I get Weather Services?

What Services are available?

How do I use them?

Keep this booklet handy, on the ground and in the air. To a beginner, it is a quick introduction to weather practices; to the seasoned flyer, it will be a brief and handy reference.

WHERE TO GET WEATHER SERVICES

Preflight Weather Service

Some 50 Weather Offices across Canada maintain a display of aviation weather information for preflight planning purposes including current reports, forecasts and weather maps. Service include briefing by a skilled technician. These offices are mainly located at larger airports or near large centers of population.

At other airports Weather Stations and Aeradio Stations keep watch on the weather. Most of these stations are connected to the meteorological communication system and can provide current weather reports and forecasts for your flight.

With the rapid expansion of aviation activity in Canada it is not always possible to ensure a personal briefing for each flight and in particular during periods of unfavourable weather. Under these circumstances pilots are encouraged to make maximum use of the self briefing display in MOT offices, and aviation weather broadcasts. Arrangements can be made for a connection on the meteorological teletype system in company or flying club offices at cost.

Inflight Weather Service

Scheduled weather broadcasts are made twice each hour by Aeradio Stations on the voice facility of the L/MF

Navaid. These broadcasts are limited to the latest aviation weather reports from local and nearby stations and SIGMET messages.

Additional reports, terminal forecasts and forecast winds and temperatures aloft are available on request. At selected locations including Montreal, Toronto, Vancouver and Abbotsford a continuous transcribed aviation weather broadcast provides terminal and area forecasts and weather reports for airports within range of the broadcast.

The telephone number of the nearest Weather Office, Weather Station or Aeradio Station can be obtained from the airport operator. They are listed in the local telephone directory under Government of Canada, Ministry of Transport, and in the Canada Air Pilot.

When requesting weather information you will greatly assist the briefer and get faster service if you tell him the following:—

- (1) That you are a pilot. Many requests for weather information are not related to aviation.
- (2) The type of aircraft you are planning to fly. Light single engined, high performance multi-engined and jet aircraft require different information.
- (3) Your destination, enroute stops and estimated time of departure.
- (4) Whether you can go IFR.

Once in a while the information available at a Weather Station or Aeradio Station may not meet your needs, in particular in northern areas where forecasts are not issued on a routine basis, and for longer range flights. Special forecasts will be obtained without charge from the responsible Weather Office using the Ministry of Transport communications system. To cut down on delays you should provide at least three hours advance warning of a requirement for such forecasts. Alternatively, the local office will provide the telephone number of the nearest office at which the necessary information is available. All private calls or wires are made at the pilot's expense.

Available Services

AVIATION WEATHER REPORTS

Aviation Weather Reports are coded hourly reports of the observed weather: ceiling, visibility, surface wind etc. They are made by trained observers at over a hundred stations in Canada, and you can obtain a wide selection of these reports at any office on the teletype network. Reports from the U.S. are also available.

Curiously enough, these aviation reports are often a mystery to pilots. They shouldn't be. We know of an international war-time bet that anyone – but anyone – could learn to read these reports in half an hour. And our man won his point with minutes to spare.

So take half an hour and see how you make out. The code is quite easy, once you realize that the symbols refer to real weather conditions, the same weather you've been watching for years.

Now for a look at the reports (see section on Aviation Weather Reports on pages 6 and 7).

Caution No. 1: Never assume that Aviation Weather Reports give you a complete weather picture. They don't. They merely describe existing weather conditions at specific times and "specific places". Between stations a hundred miles apart, the weather can be drastically different from what is reported at either station. Then, too, a report of good or bad weather at a station doesn't mean it will be the same when you get there. It's still true that weather can change faster than you can fly.

For the full weather story, always consult both **reports** and **forecasts** before you take off.

PILOT REPORTS

Pilot Reports are your own reports of the weather conditions you observe during flight. Normally, they contain information on cloud types and amounts, upper winds, turbulence, icing, temperatures, etc.

Now, such reports are often very useful to the forecaster and to other pilots planning trips over the same route. Whether or not the reports are on hand depends on you. Without your co-operation in filing reports this type of service remains a blank.

Next time you fly, be sure to discuss the weather conditions you met during flight with weather personnel at your destination. And remember — a report of fine weather is often just as valuable as a report on the bad stuff.

OTHER REPORTS

Weather surveillance Radars are in operation at a number of locations across Canada. Regular observations of convective type cloud and precipitation areas are made each hour and distributed to Weather Offices for use in the preparation of aviation weather forecasts and in pilot briefing.

HOW TO READ AVIATION WEATHER REPORTS — SA's

SA106 041500Z
 WG B12@2S-F 207/9/4/3419G28/007/SC10 QADOS 214
 QK P5X1/2S 1 68/6/0/3416/991/S10 VSBY OCNLY 1/4 114
 XL 6@18@220@3SW-151/0/-4/3214/985/FSISC6C13 315

SKY CONDITION

Symbols are used to report the amount of sky cover:

- clear — no cloud.
- scattered — 1/10 to 5/10 sky cover.
- broken — 6/10 to 9/10 sky cover.
- overcast — 10/10 sky cover.
- X partially obscured — sky partially obscured by a layer of fog, smoke, etc., whose base is at the ground.
- X obscured — sky completely obscured by a layer of fog, smoke, etc., whose base is at the ground.

A minus sign (—) preceding ○, ⊕, or ⊕ means that the sky cover is thin. Note that —○ or —⊕ does not constitute a ceiling.

STATION
 Canadian weather reporting stations are assigned two-letter identifiers. For example, WG indicates Winnipeg, YZ indicates Toronto (Malton), etc.

WEATHER

The weather elements of the report are indicated by the following symbols:

- L drizzle
- ZL freezing drizzle
- R rain
- ZR freezing rain
- RW rain shower
- S snow
- SW snow shower
- SP snow pellets
- SG snow grains
- IC ice crystals
- T thunderstorm

BAROMETRIC PRESSURE

is indicated by a group of three figures representing tens, units and tenths of millibars. A pressure of 1014.8 millibars is written as 148; 989.9 as 899; 148; 989.9 as 899; etc. Sea level pressure in Canada varies roughly between the extremes of 960.0 and 1050.0 millibars.

Intensities are indicated as in the following examples:
 Very light rain R-
 Light rain R-
 Moderate rain R
 Heavy rain R+
 A tornado is reported in plan language — TORNADO.

CLOUDS

The Cloud form or an obscuring phenomenon, corresponding to each layer reported in the sky condition group, is given by an abbreviation followed by a number giving the tenths of sky concealed by the layer. For example: Sky condition;—X 30 ⊕ 200—⊕ Clouds: F2 SC2 C11

- CI cirrus
- CS cirrostratus
- CC cirrocumulus
- AS altostratus
- AC altocumulus
- ACC altocumulus castellanus
- NS nimbostratus
- ST stratus
- SF stratocumulus
- CU cumulus
- CF cumulus fractus
- TCU heavy cumulus
- CB cumulonimbus

OBSCURING PHENOMENA

- F fog
- K smoke
- H haze
- S snow
- R rain
- L drizzle
- A hail
- BS blowing snow
- D dust
- N sand

DEWPOINT SETTING

is indicated by figures giving its value to the nearest degree Fahrenheit. Values below zero are indicated by the entry of a minus sign (—) immediately preceding the figures for dewpoint.

indicated by a group of three figures representing the units, tenths and hundredths of an inch of pressure involved. Thus, 30.00 inches is written 000; 29.72 as 972; etc.

CEILING	VISIBILITY	OBSTRUCTIONS TO VISION	TEMPERATURE	WIND	REMARKS	PRESSURE TENDENCY
<p>Ceilings and cloud heights are given in hundreds of feet above ground with the final "00" of the figure being omitted. For example: "4" means 400 feet; "23" means 2300 feet; "120" means 12,000 feet.</p> <p>The numerical value of the ceiling is always preceded by a single letter which indicates the nature and the method of determination of the ceiling.</p> <p>M—Measured ceiling A—Aircraft ceiling B—Balloon ceiling W—Indefinite ceiling P—Precipitation ceiling E—Estimated ceiling</p> <p>The absence of such a letter in the sky condition group indicates "ceiling unlimited". The letter V following the ceiling figure indicates that the height is variable.</p>	<p>The prevailing horizontal visibility is reported in miles and fractions of miles. The letter "V" immediately following the visibility figure indicates a fluctuating visibility.</p>	<p>are indicated by the following symbols:</p> <p>BD blowing dust BN blowing sand BS blowing snow D dust F fog IF ice fog H haze K smoke</p> <p>Speed is given directly in miles per hour by the wind direction—3218 indicating a wind from 320 degrees at 18 m.p.h.</p> <p>Gustiness is indicated by a G after the speed, e.g. 3125G. The speed of the peak gust may be given after the G, e.g. 3125G28.</p> <p>Squalls are indicated by a "Q" following the speed, e.g. 3125Q. Peak gusts with the squalls may be indicated by the number following Q, e.g., 3125Q42.</p> <p>Significant wind shifts will normally be reported in the "Remarks" section together with the time they occurred.</p>	<p>is given to the nearest degree Fahrenheit. Values below zero are indicated by the entry of minus sign (—) immediately preceding the figures for temperature. Zero itself is indicated as "0"</p>	<p>Wind direction (measured from true north) is indicated by figures in tens of degrees as follows:</p> <p>360 degs (N) —36 045 degs (NE) —04 160 degs (SSE) —16 270 degs (W) —27 etc.</p>	<p>may provide additional weather information or information on radio aids and communications.</p> <p>Teletype cloud and wind symbols and standard word contractions are used in these remarks.</p>	<p>When included, the pressure tendency is indicated by a group of three figures at the end of the remarks. It indicates in code form the way in which the barometric pressure has changed in the preceding three hours and the amount of that change in tenths of millibars.</p>

MEANING OF EXAMPLE

Aviation Weather Report—Meteorological Teletype Circuit Number 106—Date 4th day of the month—Time 1500 GMT.
 Winnipeg: Balloon ceiling 1200 feet, sky overcast; visibility two miles; light snow and fog; sea level pressure 1020.7 millibars; temperature 9 degrees; dew point 4 degrees; wind north northwest 19 miles per hour, gusty, with peak gusts to 28; altimeter setting 30.07 inches; clouds stratocumulus ten-tenths; middle marker out of service until further notice; pressure tendency rising steadily — net change +1.4 millibars.

MISSING DATA

Elements normally sent, but for some reason missing from the transmission, will be indicated by the letter "M" entered in the report in place of the missing data.



AVIATION WEATHER FORECASTS

Aviation forecasts are tailored to meet your needs. Every predictable weather element affecting flight operations from clouds, icing, turbulence, winds and temperatures aloft to surface visibility and winds, is treated in detail.

Forecasts are issued by designated Weather Offices across Canada on a routine or request basis under headings as follows:—

FT — Terminal forecasts

FA — Area forecasts

FD — Winds and Temperatures Aloft forecasts

FL — SIGMET messages — These messages are intended to provide short term warnings, to aircraft in flight, of certain potentially hazardous weather phenomena. The list of phenomena is limited by international agreement to the more serious hazards which are important to all types of aircraft but does not necessarily cover those of importance only to light aircraft of VFR operations. Warnings are issued for active thunderstorm areas, lines of thunderstorms, heavy hail, heavy or severe turbulence or icing, marked mountain waves, hurricanes and wide-spread sand or dust storms.

The best way to get acquainted with these forecasts is to read them. If you can handle aviation weather reports, these forecasts should be easy. The same teletype symbols and word abbreviations are used in both.

Caution — It is important to remember the level of reference for heights in aviation weather reports and forecasts. All heights in aviation weather reports and terminal forecasts are expressed **above ground level**. Heights in area forecasts are expressed **above sea level**. In special circumstances where the forecaster does not follow these rules, the reference level will be clearly stated.

Examples

1. Terminal Forecasts

FT2 YZ1 091630Z
17-17Z

QG 50①C100①6H 2315. 0900Z C50①100①RW- 2320.
YZ C30①80①6H 2312. 0600Z 50①C120①. 1200Z 120①
TR 30①C100①/①6H 2315G20 OCNL RW-, 1000Z 50①C120① 2315
END

DECODE

Terminal forecasts issued by the Weather Office at Toronto Intl. at 1630 Greenwich Mean Time (GMT) on the 9th day of the month and valid until 1700 GMT on the 10th. **WINDSOR (QG)** 5 thousand scattered, ceiling 10 thousand broken, visibility 6 miles, haze, surface wind 230 degrees 15 mph; 0900 GMT ceiling 5 thousand broken, 10 thousand overcast, visibility 10 miles or more, light rain showers, surface wind 230 degrees 20 mph.

2. Area Forecasts

FA EG1 171720Z
18-06Z

ALL HTS ABV MSL UNLESS NOTED

PROG

FLAT RDG FORT SMITH-MCMURRAY-LETHBRIDGE AT 1800Z MOVG TO MEDICINE HAT-NORTH BATTLEFORD-250 MI E OF FORT SMITH BY 0600Z. SLOLY DPNG TROF PRINCE GEORGE-FORT NELSON. AIR UNSTBL AND FAIRLY MOIST. UPSLP CNDS OVR SRN ALTA

EG-1

LETHBRIDGE RGN

CLDS AND WX. 50①80 110①140 BCMG 50①80 110①140 AFT 0400Z
ICG. LTG RIME ICGIC. FRLVL 40

EG-2-3-4

CALGARY CORNATION EDSON RGNS

CLDS AND WX. 60①CU100/-① BCMG /-① AFT 0100Z

ICG. LGT RIME ICG IN CU. FRLVL 40

EG5

EDMONTON RGN

CLDS AND WX. 60①CU100 OCNLY 60①TCU150 6RW - BCMG 100①130 BY 0200Z

ICG. MDT CLR ICG IN TCU60-150 OTRW LGT ICGIC. FRLVL 40

TURBC MDT VCNTY TCU TIL 2400Z

END

NOTE:

Maps showing "Areas of Forecast Responsibility" and "Aviation Forecast Regions" should be displayed at locations where aviation forecasts are available.

3. Upper Wind and Temperature Forecasts

FD 1 AO 071530

BASED ON 1200 DATA VALID 080000 FOR USE 21-03

	3000	6000	9000	12000	18000
VR 2621	2425-07	2430-10	2434-16	2542-26	
YF 2523	2432-04	2338-08	2342-13	2448-24	
XC	2431-02	2339-06	2344-11	2352-22	
YC	2426-03	2435-06	2439-12	2347-22	
QL	2527-01	2437-05	2442-10	2450-21	

4. SIGMET

FL YZ 171800Z

171800-172200Z

SIGMET 5, LN OF TSTMS OBSD ON WX RADAR YB QA XU TOPS TO 30 THSD MVG E 20
END

WORD LIST

These contractions are the ones most commonly used in Aviation Forecasts and Aviation Weather Reports. It is not a complete list.

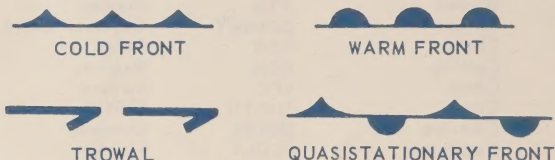
ABV	Above	LYRS	Layers
ACRS	Across	MOV	Move
ACTV	Active	MXD	Mixed
ADVN	Advance	NOTAM	Notice to Airmen
AFT	After	NR	Near
AHD	Ahead	NRLY	Nearly
ALF	Aloft	NRN	Northern
ASOCTD	Associated	OCLN	Occlusion
BCKG	Backing	OCNL	Occasional
BCMG	Becoming	OTRW	Otherwise
BFR	Before	OVC	Overcast
BGNG	Beginning	OVHD	Overhead
BINOVC	Breaks in Overcast	OVRNG	Overrunning
BLO	Below	PCPN	Precipitation
BOVC	Base of Overcast	PRD	Period
BRFLY	Briefly	PROG	Prognostic
BRKN	Broken	PTN	Portion
BTN	Between	QSTNRY	Quasistationary
CHG	Change	RDG	Ridge
CIG	Ceiling	RGN	Region
CLD	Cloud	SFC	Surface
CLR	Clear	SHFTG	Shifting
CLRG	Clearing	SHWRS	Showers
CNDS	Conditions	SLOLY	Slowly
DCRG	Decreasing	SMK	Smoke
DFUS	Diffuse	SNW	Snow
DNS	Dense	SPRDG	Spreading
DPN	Deepen	SRN	Southern
DRZL	Drizzle	STBL	Stable
DSIPTG	Dissipating	STG	Strong
DVLPG	Developing	SVR	Severe
ERN	Eastern	THRUT	Throughout
FCST	Forecast	THSD	Thousand
FRZG	Freezing	TRML	Terminal
GND	Ground	TROF	Trough
GNLY	Generally	TROWAL	Trough of Warm Air Aloft
HI	High		
HND	Hundred	TSHWRS	Thundershowers
HRS	Hours	TSTM	Thunderstorm
HTS	Heights	TURBC	Turbulence
HVY	Heavy	UNL	Unlimited
ICG	Icing	VCNTY	Vincinty
INCRG	Increasing	VRBL	Variable
INTS	Intense	VSBY	Visibility
INTMT	Intermittent	WKNG	Weakening
IPVG	Improving	WNDS	Winds
LGT	Light	WRN	Western
LK	Lake	WV	Wave
LO	Low	WX	Weather
LVL	Level	XPCD	Expected
LWRG	Lowering	XTRM	Extreme

ON THE WEATHER MAP

The weather map is not a trap — it's a guide to the atmosphere. So don't shy away from it. Ask the briefing officer to explain the details.

Just in case you ever have to interpret a map without expert help, there are a few general points to remember:

1. Check the time of the map, make sure it's the latest one available.
2. Always remember that "weather" moves. A map gives you a static picture of weather conditions over a large area at a specific time. Always use a map along with the latest reports and forecasts.
3. The curving lines on the map which form patterns like giant thumb-prints are called isobars. Joining points of equal sea level pressure, isobars outline the areas of High and Low pressure, marked H and L, respectively.
4. The winds at 2,000 feet above ground blow roughly parallel to the isobars — in a clockwise direction around Highs and counter-clockwise around Lows. Wind speeds vary with the distance between isobars. Where the lines are close together, you can expect moderate to strong winds; where they are far apart, expect light variable winds.
5. The lines indicating the zones of contact between air masses with differing physical properties are called fronts. They are represented on the map by the following symbols:—



When coloured lines are used, blue designates cold fronts, red lines warm fronts and alternate red and blue lines are quasistationary fronts.

6. Cold fronts indicate cold air advancing in the direction of the pointed symbol and warm fronts indicate warm air advancing in the direction of the half circles. When neither the warm nor the cold air is advancing, the front is indicated as quasistationary. A TROWAL indicates a trough of warm air aloft. Solid lines are fronts which produce air mass changes at ground level as well as in upper air. Broken lines represent "upper air" fronts — they are also important.
7. Changes in "weather" occur on passing through an active front.

EPILOGUE

Unless you skimmed through this booklet or started in from the back cover, you should know a fair amount about weather services for the pilot. The services are there — for free. All you have to do is ask for them.



Queen's Printer for Canada
Ottawa, 1970

Cat. No.: T56-1970